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Dusty Oklahoma Cowhands Round Up More Than 600 Head of Lumbering Bison at Wichita Mountain Wildlife Refuge. Reserve Started in 1907 with 15 Beasts

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GEORGE LEAVENS

match it in beast-to-beast combat. But the bison's short sight and stupidity controlled its numbers. When the herd reached a spring-warmed river its irresistible pressure would shove thousands of front-rank beasts onto the crumbling ice to drown. Stampeded by Indians, scores would leap to their death from a precipice.

By this method, and by riding alongside a running herd to send flint-tipped arrows smashing through the tough hides of selected animals, Indians killed what they needed for food, shelter, clothing, tools. They wasted no part of their prey. Then the first white hunters came, carting home heavy hides which fetched high prices. A surge of well-armed profiteers stormed the prairies, quickly decimating the great herds.

In the ten years following the Civil War, 20,000,000 buffalo hides flooded the market. Thousands of beasts were shot just for their tongues—a dinner-table delicacy. Buffalo meat was so plentiful that by 1873 it was selling for a cent a pound. Railroads cut through the grazing lands with carloads of "sportsmen" who fired wantonly into the packed masses and left the dead to lie beside the tracks. Army officers encouraged the slaughter because without this staple resource the turbulent Redskins would have to move on. Between 1870 and 1875 about two and a half million bison were slain each year. Bones whitened wide areas of the prairie. In 1891 a bone-buying firm purchased nearly 6,000,000 buffalo skeletons to sell for fertilizer.

Thus ended the long retreat of the wild herds that once ranged over almost all the continent. An early explorer reported seeing bison near what is now Washington, D. C. The first settlements pushed them west of the Appalachians, then across the Mississippi. When westward expansion promoted their massacre, bison herds stretched from Canada through Montana and the Dakotas, down to Texas and Mexico. The Rocky Mountains formed their western boundary.

Dependent on sense of smell, bison always faced the wind, moving stubbornly toward the scent of water or fresh grass, or nosing into a warm spring breeze on migration. Swarms of flies heckled grazing herds. To escape they sometimes plunged off on an earth-shaking stampede, but more likely wallowed in mud to armor themselves with sun-dried clay.

Old buffalo wallows can be seen today in the prairies. Buffalo trails, cut by the cleft hoofs of millions of migratory beasts, form the basis for many a modern highway and railroad bed. More and more the animals themselves can be seen. Biggest North American reserve is Canada's Wood Buffalo Park near Great Slave Lake, where 12,000 big, dark-haired wood buffaloes browse through 17,300 square miles of wilderness.

Four hundred years ago Spanish conquistadors along the Pecos River determined to domesticate bison. All attempts to corral them failed, since an angry 2,000-pound bull buffalo can slam through a fence of two-inch boards without even slowing up. Now, from Pennsylvania to the mountain states farmers raise many small herds of bison. Market price for two calves may reach $600. Buffalo steak sells for about $2.00 a pound.

References—*National Geographic Magazine*, April, 1952, "Hays, Kansas, at the Nation's Heart"; May, 1947, "South Dakota Keeps Its West Wild"; July, 1939, "Lords of the Rockies." *School and library discount price for Magazine issues a year old or less, 50¢; through 1946, 65¢. Write for prices of earlier issues.*

UMI

NATIONAL GEOGRAPHIC PHOTOGRAPHER J. BAYLOR ROBERTS

The Buffalo Returns—But Not 60,000,000 Strong

The buffalo has disappeared from the five-cent piece, but not quite from its native American sod. On private ranges and government reserves like Canada's Waterton Lakes National Park above, the massive, hump-shouldered American bison still thrives. In fact, conservationists must thin out herds at intervals, otherwise overgrazing on limited ranges would cause starvation.

Today there are probably well over 20,000 head of bison in North America, a gratifying increase since the turn of the century when they numbered a thousand at most. Much credit for their reprieve from extinction goes to the American Bison Society, 50 years old this year.

Yet today's thousands seem a pitiful population compared with the estimated 60,000,000 of a century ago. Instead of a handful of shaggy hulks dotting the pastures of a ranch, a migrating herd in 1855 would darken the untamed prairie like a tawny ocean, 25 miles wide, 50 miles long. Grunting and scuffling, the heavy bison might take as long as four days to shamble past a hunter's camp, unaware that the lonely human who occasionally shot down one of their number was starting them on the road toward extermination.

Immensely powerful, indifferent to extremes of climate, the wild bison of early America had few natural enemies. Only the grizzly bear could

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Cotton was the chief material spun and woven by Mayan ancestors of present-day weavers. For more elaborate costumes and ceremonial cloth, brightly colored feathers or gold and silver threads added luxury touches.

Introduction of sheep and goats by Spanish colonists brought welcome wool to the chilly uplands for blankets and heavier garments. Spaniards also imported silk, still popular along with modern rayon.

Through the centuries, Guatemala's story has been written on its textiles. Centaurlike figures, depicting conquistadors on horseback, parade through the designs, as do stylized birds and beasts the Indians knew. The familiar double-headed eagle motif may stem from the crest of Charles V, Holy Roman emperor who was Charles I of Spain. Some think the symbol goes back even further to dual Mayan gods of good and evil. Colors reflect the tones of Guatemala's purple mountains, its crimson sunsets, deep blue lakes, and rich green forests.

Nature itself long supplied durable dyes—blue from the indigo plant, scarlet from female cochineal insects, black from a small snail, royal purple from a mollusk found along the Nicaraguan coast.

Imported aniline dyes have come to replace most of the natural products. But now, as in the remote past, weavers often leave a blank spot in their patterns. The imperfection is there to placate any envious god.

Once each town, tribe, or family wove and wore its own strictly followed traditional patterns. Clothes revealed the man—not only his home, but social position, age, and marital status.

Today modern ways of life are gradually wiping out the distinctions. The Indians are accepting new designs and sharing both old and new with their neighbors. But plenty of individuality remains. One market woman, for example, wears a true tribal blouse overlaid by gay little figures of rabbits and chickens. These additions, she explains, "cheer the huipil up."

References—Guatemala appears on the Society's map of Mexico and Central America. *National Geographic Magazine*, Oct., 1947, "Guatemala Revisited"; July, 1945, "To Market in Guatemala"; Oct., 1936, "Guatemala Interlude"; GEOGRAPHIC SCHOOL BULLETINS, Feb. 9, 1953, "Guatemala Plans Trade Increase in Hardwoods."

Quick Quiz on Cradles of Civilization Series (see page 344)

1. **What countries now occupy the homeland areas of the four ancient civilizations described?**
2. **What are the main contributions to our life of each of these civilizations?**
3. **What do you think are the main differences between living in ancient times and now? The main similarities?**
4. **Contrast Athens and Sparta.**
5. **Latin is the root for several languages. Can you name them?**
6. **Why did Egyptians put food and gifts in pyramids?**
7. **What ancient shrine is the Greek government restoring today?**
8. **What are scientists called who reconstruct ancient life by studying excavations?**
9. **What two rivers flowed along the edges of Mesopotamia?**
10. **How did a Biblical character benefit from Egypt's tolerance?**

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UMI

LUIS MARDEN, NATIONAL GEOGRAPHIC STAFF

Guatemala's New Loom Keeps Maya Craft Alive

Kneeling at a primitive hand or "hip" loom, a dark-haired Indian woman weaves lengths of cotton cloth in unique designs. Perhaps it will become a costume for herself—wrap-around skirt and loose blouse called a *huipil*. Perhaps trousers, shirt, and jacket will emerge to clothe her husband.

Made of two sticks with warp threads stretched between, one end of the crude loom is tied to a tree, the other to the weaver's belt. Shuttles of thorn or bone guide weft through warp.

With these simple hand tools, Guatemalans developed their "walking-rainbow" textiles, first discovered by the outside world when Spanish conquistadors pushed southward in 1523. Even then, weaving was an old art, using lively figures and symbols that persist today, especially in the clothing worn by the Indians.

To help preserve this ancient native industry, a new loom has been adapted from a 19th-century model built by the French silk weaver, Joseph Marie Jacquard. Remodeled by a member of the United Nations assistance mission to Guatemala, the loom operates on player-piano principles. An endless roll punches out each pattern. The weaver duplicates it.

Until this equipment was developed highland craftsmen faced a losing battle to make a living from their slow and painstaking work. The Guatemalan Jacquard loom with its higher speed is now hailed as the answer to the problem of increasing production without losing the charm of the old Mayan designs.

the impact of their past. Their language owes much to a colloquial form of Latin dating from the days of empire. Their devout Christianity was introduced by Visigoth kings. Moors brought a flavor of the exotic, especially to Spanish architecture.

Thick-walled Moorish castles still etch rolling hilltops, sharing the horizon with windmills like those with which Don Quixote tilted. The empty shell of a Moorish redoubt (bottom) broods over the town of Consuegra in the Province of Toledo.

Some of Spain's castles had specialized duties. The Fort of Santeluro (lower left), guarded the town of Fuenterrabía, now a seaside resort on the Bay of Biscay. Its job was to discourage pirates.

The greatest Moorish castle of them all, the Alhambra at Granada in the south of Spain, served as fortress and palace combined. Rich with Oriental luxury and ornament, it housed the last Moorish ruler to hold out against Christian rulers.

Today a girl gazes from a window in the Alhambra (upper left) where Ferdinand and Isabella, in 1492, smashed Moorish resistance by ringing the structure with steel, and forcing its surrender.

So great was the rejoicing in Spain over this final deliverance, that the exploits of one Christopher Columbus, that same year, almost went unnoticed.

(LEFT) JUSTIN LOCKE
(ALL OTHERS) LUIS MARDEN, NATIONAL GEOGRAPHIC STAFF

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Castles in Spain Tell of Turbulent Past

The name Castile means "Land of Fortresses." Applied to the wide, central area of the Spanish peninsula, such a name hints of old, violent days of bared lances and thundering hoofs, flashing scimitars, and bell-mouthed arquebuses. Sun-washed Spain, silent at noontime, gay in the evening, has seen its share of triumph and defeat. Its castles, many crumbling on their barren hilltops, attest to this.

The breath-taking Alcazar (above) looms over Segovia in the middle of Castile, its fairy-tale towers reaching for the sky. History haunts its foundations, for when Alphonso VI ordered its construction in the 11th century, he chose a rocky ledge soaring 262 feet above the town where other forts, dating back to pre-Roman days, had been built. From this site Celt-Iberian tribesmen faced the well-drilled legions of the expanding Roman Empire.

Rome's conquest was only the first in a long series of invasions. Vandals and Visigoths swept across the Pyrenees a year before their horsemen looted Mother Rome itself. Three centuries later Moslem hordes from north Africa rampaged. Spain's Moorish occupation lasted 800 years before collapsing under the stubborn resistance of native leaders like the colorful Cid.

Today Spain's 28,000,000 people reflect the impact of their past. Their language owes much to a colloquial form of Latin

On his return to Rome, a triumphant emperor-general clad in gold breastplate and red-purple mantle rode on a gilded, laurel-wreathed chariot drawn by four white horses through the Arch of Titus built by Domitian in A.D. 81. As the procession moved along, cheering citizens saw horse-drawn floats, laden with booty, followed by captive princes and generals stumbling along in chains.

By the time of the *pax romana*, the peace of Rome, when Augustus Caesar became first emperor in 27 B.C., conquered lands in Europe, Asia, Africa surrounded Italy. Virgil, Rome's greatest poet, wrote his national epic *Aeneid* to celebrate the glory of Rome and its new emperor.

Broad bands of straight all-weather highways—some still existing—helped tie the empire together from Scotland to the Persian Gulf some 4,000 miles away, and from Morocco through Egypt to Turkistan. Throughout the empire, engineers built great stone viaducts to carry military roads or water channels. During Trajan's reign, they spanned Spain's chief river, the Tagus, with a huge 200-foot-high bridge, called the Alcántara, made of granite blocks set without mortar. Visitors to lands of the old empire still see remnants of Roman aqueducts and bridges built some 2,000 years ago.

Wealth poured into Rome from all corners of the world. Roman ships sailed home through the Red Sea-Nile Canal laden with gems from Ceylon. Merchantmen from Egypt brought grain to Ostia, thriving seaport for the capital. Olive oil and wine flowed to Tiber River wharves from Spain and Greece. Caravans brought Persian rugs and Chinese silk, worth its weight in Roman gold. Animals for the Colosseum's wild-beast fights were imported from Sudan and the Sahara.

Trade thrived in bazaar-like Roman markets that opened on paved quays and jutting wharves where cargo vessels moored. Lantern makers, cutlers, coppersmiths, and other metal workers displayed their wares in dark, cool niches of these huge masonry markets.

FROM A PAINTING BY H. M. HERGET, © NGS

A victorious Roman emperor in shimmering gold breastplate leads shackled prisoners down the Sacred Way, past the Colosseum, and through the Arch of Titus. Emperor Domitian built the arch in A.D. 81 to commemorate Titus's victory at Jerusalem.

UMI

FROM A PAINTING BY H. M. HERGET, © NGS

Cradles of Civilization, No. 4: Rome

Desperate sailors fight for their lives. Warships crash and splinter. Blood from broken heads clouds churning water. Meanwhile, 50,000 spectators cheer themselves hoarse in Rome's water-filled Colosseum, flooded just for this spectacle by hidden canals.

Tomorrow when the ancient world's greatest theater is dry again, crowds may see gladiators in combat, a wild-beast fight, or a dueling match between trained fighters—one in full armor, the other armed only with a casting net and three-pronged fishing spear.

This was Rome almost 1,900 years ago, center of an empire circling the Mediterranean. The greatest of ancient powers took eight centuries to reach such a peak of domination that its captives could be forced into gladiatorial combat for the depraved amusement of the multitude.

It all began humbly with the proud Romans in a captive role. They revolted, overthrew the Etruscans who had ruled them for 250 years, and set up a republic that mushroomed until it controlled all Italy.

Soon Roman legions attacked and conquered commercial Carthage for Mediterranean supremacy. More conquests followed. Roman generals like Sulla, Pompey, Julius Caesar, and Mark Antony subdued Sicily, Spain, Macedonia, Greece, Asia Minor, Gaul, and later, Britain.

Imperial soldiers were masters of siegecraft. Working behind interlocked shields in the thick of battle, they erected portable wooden towers higher than enemy walls and then scampered to the top, storming their foes from overhead. Well-trained and mobile, only about 150,000 citizen soldiers and an equal number of non-Italian auxiliaries were needed to hold the empire together.

tem designed to uphold civil rights and impart justice. This system forms much of the basis of present-day law.

Public libraries dotted the empire, even in remote towns in north Africa and Gaul. In Timgad, some 23,000 volumes filled shelves in one of the empire's greatest libraries. Citizens checked out neat papyrus scrolls for home reading.

Despite such sinister emperors as Tiberius, mad Caligula, and Nero, Rome prospered under the reign of others—businesslike Trajan, who stretched Roman territory to its greatest peak, cultured Hadrian, and sage Marcus Aurelius.

After Aurelius, decline set in, ending when Constantine moved his capital to Byzantium and renamed it Constantinople. But much of ancient Rome lives today. Latin forms the root of French, Spanish, Portuguese, Romanian, and Italian.

Science and culture, nurtured as a spark in ancient Mesopotamia and Egypt, and kindled in Greece, burned brightly in Rome and was handed down to light the modern world.

This ends the Cradles of Civilization series: see Quick Quiz on p. 341.

References—The Roman Empire is shown on the Society's map, Classical Lands of the Mediterranean. Write the Society, Washington 6, D. C., for publication order list. *National Geographic Magazine*, Nov., 1946, "Ancient Rome Brought to Life" and "The Roman Way"; March, 1940, "Italy, From Roman Ruins to Radio"; GEOGRAPHIC SCHOOL BULLETINS, April 5, 1954, "More of Pompeii Comes to Light"; Dec. 11, 1950, "Pompeii Continues to Yield Secrets." The two articles from the Nov., 1946, issue of the *Magazine* are included in the Society's 368-page book richly illustrated with H. M. Herget's full-color documentary paintings, $5.00 in U. S., $5.25 elsewhere.

Papyrus Scroll "Books," Resembling Narrow Rolls of Wallpaper, Filled Roman Libraries Like the One at Timgad in North Africa. Scholars Used Jet-Black Ink with Reed Pens

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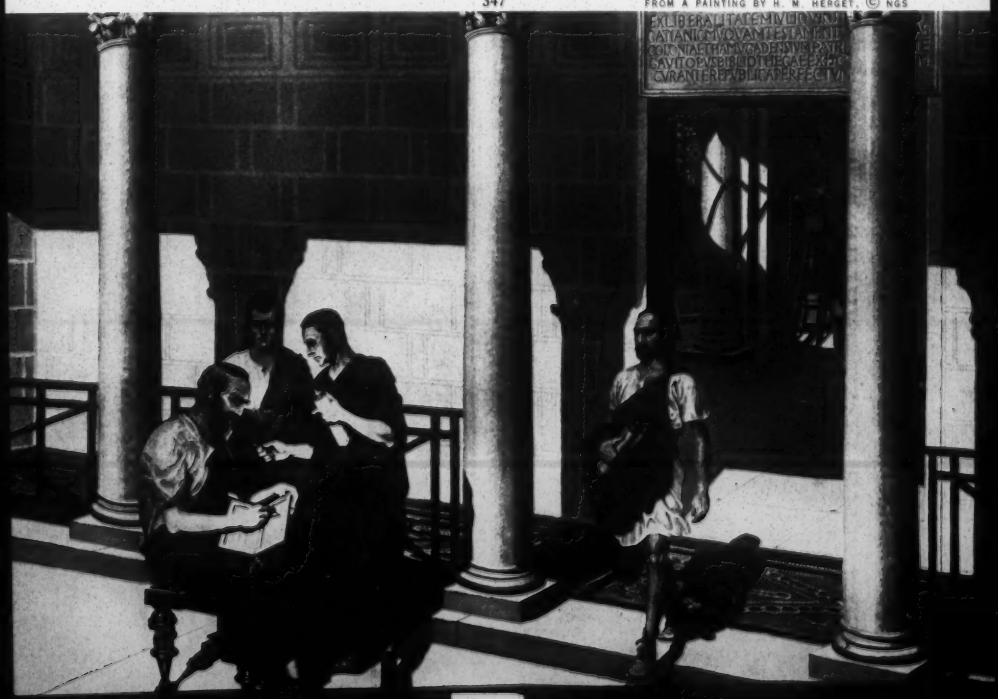

In vegetable markets, Romans thumped green-rinded watermelons, bargained for much-prized honey melons and large yellow melons from Persia. They took their choice of grapes, apples, pears, and plums. Figs were almost over-abundant. For his master's table a servant could select mulberries, blackberries, raspberries, or strawberries. He had his pick, too, of the world's finest almonds, hazelnuts, walnuts, chestnuts. Plentiful for Roman tables were unbleached celery, cucumbers, yellow squash, cress, chicory, lettuce, cabbage, green beans, and Brussels sprouts.

Diners relaxed on couches around a circular table, used only the finest silverware, ate only the best food—fowl, suckling pig, mullet, fruit. Flocks of geese were driven from Belgium to provide livers for discriminating Roman appetites.

The gentry escaped to seaside villas from Rome's sticky summer heat. Among cabins and bungalows that would rival today's modern beach resorts, they sauntered along stone quays or went boating on the Mediterranean's hill-rimmed coves.

Public baths were even more elaborate. The Baths of Caracalla, one of seven in Rome, covered some 20 acres. Thousands wandered through vast halls of its central building enclosing a 200-foot-long swimming pool, a steam room, hundreds of bronze and marble statues. Reading rooms, running tracks, covered walks, and gardens surrounded the main building—copied on a smaller scale in every empire province.

Near smoking Mt. Etna, leisurely audiences watched famous Greek plays, translated for Latin ears and performed in lavish colonnaded theaters. Theater-goers applauded Roman plays of Plautus and Terence; years later Shakespeare borrowed plots from them.

Greek influence left its mark on Roman schools, too. Boys and girls first learned Latin; then upper classes studied Greek—key to culture and knowledge. Young Latins intent on a life of public service pored over Cicero's orations. They mastered Rome's legal sys-

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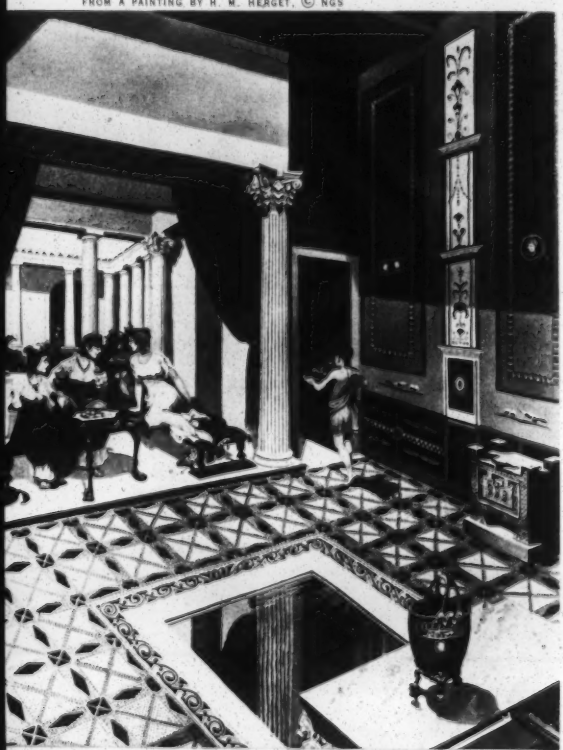
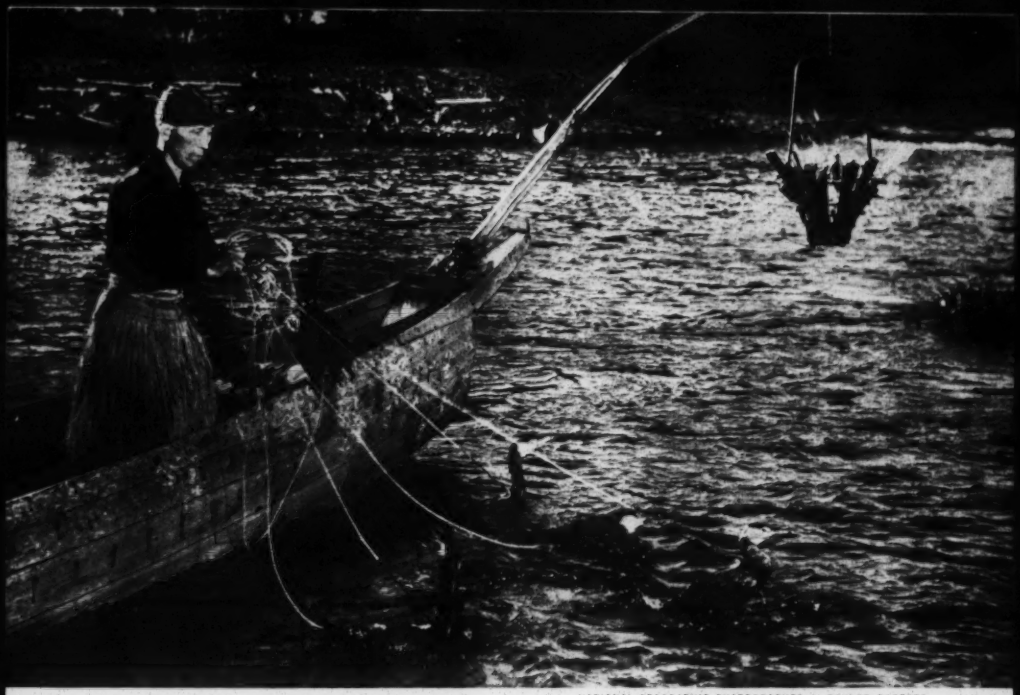


Cool tile floors, a spectacle of color, frame a shimmering pool in a rich Roman's home. Beyond the reception room lies a portico surrounding an open garden court, forerunner of the patio. Thin slabs of marble, white and colored, decorate walls from top to bottom.



NATIONAL GEOGRAPHIC PHOTOGRAPHER J. BAYLOR ROBERTS

Cormorant Fishing Still Thrives in Japan

Cormorants, ordinarily useful, law-abiding birds, recently won notoriety when accused of running a ship aground off the Irish coast. Roosting on a navigation light, they hid its beam from the passing vessel.

On the other side of the world the stocky, long-necked creatures, almost half fish themselves, earn their keep by diving for fish. They team up with Japanese fishermen to make life miserable for the ayu, a small, smelt-like swimmer. Along the Nagara River in central Honshu, boatmen now are taking out their birds, leashes, and blazing torches for another fishing season.

A wild cormorant feeds by swooping underwater after its elusive prey, scooping up the catch with hooked beak. Men harness this natural facility by slipping a cord around the bird's neck—loose enough to allow breathing, tight enough to prevent swallowing the fish. A really brisk cormorant will bring 100 to 200 fish to the surface in an hour. As a reward, it gets a meal when its chores are finished.

The fisherman above, in ceremonial cap and grass skirt, handles six birds, each on a leash long enough for swimming and diving, and manages to keep each line clear. An iron basket of blazing pitch pine lighting the water lures the fish to their doom.

For nearly 1,000 years Japanese fishermen have employed these deft birds as assistants, a custom learned from the Chinese. Cormorant fishing flourished in medieval England. Later, during the 17th century, a court official was designated Master of Cormorants.